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March 28, 1997

TO: Charles Hunter
Dept. of Pesticide Regulation
Envir. Monitoring & Pest Management Branch
FAX (916) 324-4088

FROM: Robert M. Timm, Superintendent Bob T

The final report for our project "Controlling Coyote Predation on Sheep in California: A Model Strategy" is being finalized today, and a copy will be mailed to you so that you will receive it on Monday, March 31. I will also FAX a copy of this report to your office not later than 5 pm Monday.

Just wanted to let you know I hadn't forgotten about this deadline.

Thanks for your assistance.

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March 28, 1997

Mr. Charles Hunter
Dept. of Pesticide Regulation
Environmental Monitoring and Pest Management
1020 N Street, Room 161
Sacramento, CA 95814-5624

Dear Charles:

Enclosed is a Final Report for the project *Controlling Coyote Predation on Sheep in California: A Model Strategy*. This report summarizes the work carried out through funding from your agency for the period April 1, 1996 through March 31, 1997. It also incorporates pertinent findings from the USDA-funded predator research program concurrently in progress at this Center.

We look forward to making continued progress as a result of the renewal of this grant for another 12-month period. Of particular interest will be our data on lambs lost to coyotes or missing for the remainder of the current lambing season, extending approximately until June 30 of this year. To date, our lamb losses are quite low in comparison to recent years, so we are greatly encouraged that our strategy is indeed successful. In the coming months, we shall be working toward practical applications of this strategy that will be useful to commercial sheep producers.

Should you have any questions regarding the enclosed report, please give me a call. I will look forward to seeing you at the next meeting of our Predator Research Advisory Committee, scheduled to be held at Hopland on May 5 as previously communicated.

Sincerely,

Bob J

Robert M. Timm
Superintendent and
Extension Wildlife Specialist

c: Mike Jaeger
Dale McCullough
Karen Blejwas
Martin Dally
Harry Carlson
Guy Connolly

FINAL PROGRESS REPORT
to
CA Dept. of Pesticide Regulation

March 31, 1997

Principal Investigators:

Dr. Robert M. Timm, Superintendent & Ext. Wildlife Specialist, UC Hopland Research & Extension Center

Dr. Michael M. Jaeger, Research Wildlife Biologist, USDA-APHIS National Wildlife Research Center / UC Berkeley

Dr. Dale R. McCullough, Professor, Environmental Science, Policy & Management - UC Berkeley

Project Title: **Controlling Coyote Predation on Sheep in California: A Model Strategy**

Summary: We are field-testing an innovative strategy of selectively removing known livestock-killing coyotes, in combination with deployment of llamas as guard animals, in an effort to significantly reduce predator-caused losses among our research sheep flock. Results during the current lambing season, which began in January 1997, suggest our efforts have been responsible for substantially reducing the number of lambs lost to coyotes on the Hopland Research & Extension Center as compared to previous years.

Live-capture, radio-collaring, and release of coyotes at the UC Hopland R & E Center has been in progress for several years to identify coyotes that attack sheep. The Livestock Protection Collar, which in early 1996 received registration in California for use by USDA- APHIS-Animal Damage Control (ADC) personnel, has been in use at Hopland on an experimental basis, funded largely by the current project. Since its first use here in October 1995, we believe this device has removed at least 5 livestock-killing coyotes, which in turn has reduced our sheep and lamb losses during early 1997. Additionally, the information we have gained from our collar use is assisting in making current and future use by ADC specialists more effective. The collar is designed, by means of a toxicant, to kill only those coyotes that attack sheep or goats. Training sessions for ADC specialists and ranchers in the proper use of this device have been held at Hopland and at other locations in the North Coast area. Information gained from this project has been incorporated into the training curriculum.

Concurrently, a study design to evaluate the effectiveness of llamas in guarding sheep from coyote attack is in place, and data collection began in October 1996. In theory, llamas can provide an additional means of deterring coyote attack or of directing attack toward "target" flocks equipped with LP Collars. While initial field results are too limited to permit conclusion, indications are that llamas may be playing a role in reducing coyote predation on lambs in the same pastures where the llama is present.

An innovator/research advisory group consisting of sheep producers and others from the North Coast region met in August and December 1996. This group has been instrumental in providing advice to the researchers and technicians about ways in which research findings are

applicable to commercial ranching situations. Further, the group has explored avenues for further research on predator damage control, and has been proactive in suggesting potential additional funding sources for such research. The group's quarterly meetings continue to provide a forum for substantial discussion.

Project personnel reported research progress and goals at the Annual Convention of the California Wool Growers Association in September 1996. We are continuing to schedule informational sessions and presentations to county and regional wool growers associations. These educational opportunities are facilitated by Cooperative Extension advisors in Mendocino, Lake and Sonoma counties. In addition, a progress report on our work will be presented at the 13th Great Plains Wildlife Damage Control Workshop, to be held during April 1997 in Nebraska.

Results and Discussion

Objective 1

Background Information

Attempts to live-capture coyotes on or near the Hopland Research & Extension Center (HREC) have been continuous and ongoing. From April 1, 1996 through March 25, 1997, 30 coyotes were captured or recaptured by use of traps or snares. All captured animals have been successfully radio-collared and released following collection of biological data. Currently, 16 coyotes are equipped with transmitters, of which 6 are spending a large portion of their time on HREC property. An additional 6 coyotes are spending most of their time on the periphery of Center property, while 3 additional coyotes are usually >2 km from the Center on a regular basis. One additional collared animal's location is presently unknown. A major effort devoted to radio-tracking these coyotes has produced data that reveal definitive space-use patterns for specific animals.

Benjamin Sacks, in his M.S. Thesis completed through UC Berkeley (1996), documented that most of the predation on sheep at HREC during a two-year period was caused by a few resident, territorial adult coyotes. Sacks further showed that resident, adult coyotes were unlikely to be removed from their established home ranges by traps, snares, or M-44 devices, presumably because these animals typically show avoidance of new objects in their environment (neophobia). Thus, such coyotes, once established in territories, are difficult to control with standard ADC tools during those times of the year when they have considerable territorial fidelity (which includes the time of year when lambs are normally present in California). We hypothesize that the Livestock Protection Collar is a tool that adult coyotes do not avoid, making it uniquely useful in removing problem individuals.

Between April 1 and October 31, 35 head of sheep from the Center's research flock were confirmed to have been killed by coyotes (15 lambs and 20 yearlings or ewes). During the period November 1, 1996 through March 25, 1997, only 9 sheep have been confirmed to have been killed by coyotes. A comparison of confirmed coyote-killed and missing sheep for the past several years is provided as *Figure 1*.

Livestock Protection Collar Use

Twelve deployments of "target" sheep fitted with Livestock Protection Collars (LPCs) have occurred during the period October 3, 1995 through March 26, 1997 (see *Table 1*). In each instance, between 10 and 25 sheep have been collared and placed into pastures, either where recent coyote attacks had occurred or where there was a historically high incidence of coyote predation. In three cases, a collared sheep was attacked by a coyote and the collar punctured; in a fourth case, two separate coyote attacks resulted in two collars punctured. In these instances, we presume a total of five coyotes have been killed as a result of puncturing collars during the initial attack, and the carcasses of three attacking coyotes were recovered by the use of radio-telemetry. In one of the above instances, the attacking male coyote's radio-collared mate was found dead 5 days following the attack, but the cause of death was unclear.

In three of the twelve LPC deployments, a coyote attacked a collared lamb but did not puncture the collar; in two such instances, the lamb was killed by the coyote, while in the third, the lamb survived the attack. In three of the twelve deployments, collared sheep or lambs were unexpectedly attacked by a mountain lion. In two instances, no collar was punctured in the initial attack, although the collared sheep was killed. In one unusual instance, 11 LP-collared sheep were killed by a single lion, which punctured 9 collars in the process of killing. We presume the lion received a lethal dose of toxicant in this series of attacks, although no lion carcass was found. In two deployments, no predator attacks on collared sheep occurred, and the LP collars were subsequently removed after an appropriate period of exposure. In one additional deployment, three collared sheep were lost and presumed killed; in the case of one, the collar was located and appeared to have been damaged by a rock, causing minor leakage. Neither the collar nor the sheep have been subsequently been located in the case of the additional two animals.

Llamas as Guard Animals

Llamas present at the Center have been under observation for their ability to protect sheep flocks from predator attack since October 1996. The llama study plan, designed by Dr. Michael Jaeger of the USDA National Wildlife Research Center, calls for observation of two llamas, to be rotated among pastures on a monthly schedule. Comparisons of predator-caused losses in paired pastures containing sheep, both with and without llamas, will be made over a 2-year period. Observation of two llamas deployed in pastures with ewes and lambs has occurred daily since January 1997. To date, no confirmed coyote-killed sheep have been found in pastures with llamas, while 6 confirmed killed have occurred in comparable pastures without llamas (*Table 2*). To assess llama attentiveness to sheep and individual behavioral differences between llamas, three study llamas have been checked 5 days per week before dawn or at dusk to record their proximity to sheep bedding grounds. Additionally, all significant observations of llama behavior in relation to sheep or coyotes have been recorded (see *Table 3*).

While llama data collected to date in not definitive nor adequate to be subjected to rigorous statistical analysis, it provides an indication that llamas may be of value in our situation as guard animals. No confirmed coyote kills of lambs have occurred in pastures with llamas present during the current lambing season, while there have been 6 such confirmed kills in similar pastures without llamas. In coming months, we desire to better define the criteria by which to predict whether a llama may serve as an effective deterrent to predation, if this in fact occurs.

Discussion: Capture success of coyotes was lower than anticipated during summer 1996, and a number of captured animals dispersed beyond Center property following capture and release. During fall, coyote social status and territoriality are typically in flux, and coyotes (particularly dispersing juveniles) are much more easily captured. Fall capture and re-capture success was good (14 new captures and 7 re-captures since October 1, 1996), and 16 coyotes are now equipped with radio-transmitter collars. This present grant enabled the project to contract for the services of the local USDA-APHIS- ADC specialist to assist USDA-funded students and technicians to set and maintain traps and snares. Three problem coyotes were identified by means of their radiocollars and removed from HREC property during the period April 1, 1996 through March 31, 1997.

Lamb loss data (see *Figure 1*) strongly suggests that our current predator damage control strategy at Hopland has been responsible for the marked reduction in coyote-caused losses in 1997 as compared to previous years. However, the total number of lambs present on HREC property in 1997 is lower than in some previous years, and lambs will continue to be vulnerable to coyote predation until late May or June, when surplus lambs are shipped to market and replacement lambs will have reached a body size that somewhat discourages coyote predation.

Our experience in using the Livestock Protection Collar revealed the major use limitations are a) inadvisability of use in large pasture and rugged terrain, because it is difficult to locate killed sheep and "lost" collars, and b) inconsistency of coyote killing patterns, resulting in ceased coyote predation by the time collared target sheep are deployed. To remedy the first problem, which has resulted in two lost collars, 20 used radio-transmitters were borrowed. These have now been refurbished for attachment to LP Collars to assist in locating them in cases when the target sheep is killed in a remote site. They have enabled the LPCs to be used in virtually any pasture at the Center. The second difficulty may be partially resolved by deploying LPC-equipped sheep in a pasture following the first identified coyote kill, rather than waiting until two or more kills occur in a specific pasture. More frequent LPC deployments will require more time and effort in livestock management; however, if successful this will result in fewer sheep lost to coyotes. Data collected on collar efficacy continues to aid in the design of timing and deployment recommendations for applicators and producers.

Objective 2 - The innovator group has been established with the formation of a "Predator Research Advisory Committee." They first met at Hopland on August 26, and again on December 9, 1996. A third meeting of the Committee is now scheduled for May 5, 1997. The list of persons invited, with a notation of those in attendance, is appended as *Table 5*. A fruitful interaction has been begun and is expected to continue. We anticipate the Committee will meet at least two additional times during the upcoming grant period.

Excellent rapport has been established with the USDA-APHIS-Animal Damage Control operational program. Gary Simmons, State Supervisor for the program, has been effective in interacting with the Committee. Continued interaction with Mr. Simmons as well as with John Steuber, Assistant State Supervisor; Jim Shuler, District Supervisor; and Gary Johnson, local ADC Specialist, is anticipated to be mutually fruitful. Wool growers are very interested in the use of the Livestock

Protection Collar by California ADC personnel, which began in early 1997 in Marin and Sonoma Counties, and is scheduled to begin in Mendocino County this month.

Discussion: Excellent progress has been made in the establishment of the advisory committee, which is anticipated to foster the development of a smaller innovator group from within its membership. The August 26 meeting was, of necessity, primarily informational. The December 9 meeting allowed more opportunity for interaction and input to assure that research topics being addressed were relevant to producer needs. Discussion revealed high interest in pursuing additional avenues of research leading to potential new delivery systems for toxicants or other chemical tools (e.g. chemosterilants) for predator damage control. This has led to recent applications to other granting agencies for funds to pursue such field research.

Objective 3 - Progress regarding the establishment and implementation of the current project was reported at the recent Annual Convention of the California Wool Growers Association, held September 5-6, 1996. Additionally, progress in the development of a predator control strategy at HREC was discussed by Dr. Timm at the November 1996 annual meeting of WCC-95, a coordinating committee of scientists and wildlife managers from throughout the western states which focuses on rodent and predator problems and coordinates research toward their solution. Additionally, a paper that will summarize our progress to date has been accepted for presentation at the Great Plains Wildlife Damage Control Workshop to be held in Nebraska on April 16-19, 1997. The published paper will also appear in the Workshop's *Proceedings*.

The first of several applicator training sessions was held at HREC on October 7 & 8, in preparation for the planned operational use of the LP Collar by USDA-APHIS-ADC personnel. This first session, designed to provide ADC specialists with the knowledge to become certified LPC applicators, was attended by 40 individuals. Additional applicator and rancher training sessions have been held or are planned. We expect to continue our involvement in future sessions.

Discussion: Because of our early experience in using the LPCs at Hopland, we have been in a unique position to provide practical advice to ADC specialists who work in California. These personnel are the registered applicators of this recently-registered tool. Our somewhat low initial success rate in targeting coyote attack on collared sheep, and the difficulties of managing livestock in diverse and rugged terrain, exemplifies the difficult situation faced by many producers in the North Coast and other areas of California. The data we are developing through this project regarding the effectiveness of llamas as sheep guard animals may be very useful in targeting coyote predation toward LPC-equipped sheep. By equipping the collars with radio-transmitters, it has been possible for us to develop information on collar use in terrain and circumstances beyond those recommended by the current label and beyond use patterns in other states. Information on efficacy, types of predators involved in attacking sheep, and any identifiable hazards to non-target species will assist in potential future expansion of permissible LPC uses in California.

Personnel associated with this project, and with the USDA predator research project at Hopland, have recently completed or drafted several publications which provide useful information related to this project. In addition they have given or plan to give a number of presentations related to their investigations. These publications and presentations are listed below.

Recent Publications and Presentations on Predator Research
UC Hopland Res. & Ext. Center

Blejwas, K., M. M. Jaeger, and D. R. McCullough. 1997. Turnover, territories, and sheep depredation in an exploited coyote population. (Abstract). Presented at 33rd Annual Meeting, Western Section of The Wildlife Society, Feb. 5-8, San Diego, CA.

Conner M. M., M. M. Jaeger, and T. J. Weller. 19__. Identifying coyotes that kill sheep on a northern California ranch. Submitted to *Journal of Wildlife Management.*

Conner M. M., M. M. Jaeger, and T. J. Weller. 19__. Impact of coyote removal on sheep predation on in California. Submitted to *Journal of Wildlife Management.*

Neale, J. C. C. 1996. Comparative resource use by sympatric bobcats and coyotes: food habits, habitat use, activity, and spatial relationships. M.S. Thesis, UC Berkeley. 117 pp.

Neale, J. C. C. 19__. Evaluating bobcat predation on lambs in North Coastal California. Submitted to *Journal of Wildlife Management.*

Neale, J. C. C., B. N. Sacks, M. M. Jaeger, and D. R. McCullough. 1996. Resource use by sympatric bobcats and coyotes in northern California. (Abstract). Third Ann. Conference of The Wildlife Society, Cincinnati, OH, Oct. 1-5, 1996.

Neale, J. C. C., B. N. Sacks, M. M. Jaeger, and D. R. McCullough. 1997. Overlap and partitioning of space and resources by bobcats and coyotes in northern California. (Abstract). Presented at 33rd Annual Meeting, Western Section of The Wildlife Society, Feb. 5-8, San Diego, CA.

Sacks, B. N. 1996. Ecology and behavior of coyotes in relation to depredation and control on a California sheep ranch. M.S. Thesis. UC Berkeley. 223 pp.

Sacks, B. N. 19__. Ecology and behavior of coyotes in relation to depredation and control on a California sheep ranch. Submitted to *Wildlife Monographs.*

Sacks, B. N. 19__. Increasing prevalence of canine heartworm *Dirufilaria immitis* in coyotes of California. Submitted to *Journal of Wildlife Disease.*

Sacks, B. N., J. C. C. Neale, M. Jaeger, and D. R. McCullough. 1996. Ecology of coyotes in a sheep ranching environment. (Abstract). Third Ann. Conference of The Wildlife Society, Cincinnati, OH, Oct. 1-5, 1996.

Sacks, B. N., J. C. C. Neale, M. Jaeger, and D. R. McCullough. 1997. Ecology of coyotes in relation to depredation and control on a California sheep ranch. (Poster presentation). Presented at 33rd Annual Meeting, Western Section of The Wildlife Society, Feb. 5-8, San Diego, CA.

Timm, R. M. Predator research at Hopland - an update. Presentation before the Annual Convention, California Wool Growers' Assoc., September 6, 1996, Sparks, NV

Timm, R. M., G. D. Simmons, and J. R. Hays. 1997 (*In Preparation*). Livestock protection collar use in California. to be presented at 13th Gt. Plains Wildlife Damage Control Workshop, Apr. 16-19, Nebraska City, NE.

Table 1

Deployments of Livestock Protection Collars for Coyote Depredation Control and Results

UC Hopland Res. & Ext. Center

Collar Punctured, Coyote Presumed Killed	Sheep Attacked, Collar Not Punctured	No Attack Occurred
[1*]	[5]	[6]
[4]	[7]	[10]
[9**]	[9**]	
[12]		

List of LP Collar Deployments

deployment #	*date*	*# sheep collared*	*pasture*	*collar-nights exposed*
[1]	10/3/95	25	Middle	966
[2]	11/14/95	23	James III	462
[3]	2/28/96	23	Middle	380
[4]	3/19/96	22	South	609
[5]	7/6/96	23	Lower Strip	374
[6]	7/31/96	21	West Vassar	441
[7]	9/17/96	21	Lambing, Upper Horse	540
[8]	10/14/96	20	Lower HQ West	20
[9]	1/17/97	12	Upper Horse	352
[10]	2/3/97	18	West Vassar	270
[11]	2/10/97	10	James III	252
[12]	3/6/97	20	Neiderost	361

* two separate coyote attacks occurred resulting in punctured collars
** two separate coyote attacks occurred; only one resulted in a punctured collar

Table 2

Sheep Losses to Coyotes in Pastures With / Without Guard Llamas

UC Hopland Res. & Ext. Center

	Coyote-Killed Sheep	Missing Sheep*	Total Loss
With Llama Present:			
East Vassar Pasture	0	1	1
Lambing Pasture	0	2	2
Watershed II Pasture	0	3	3
Totals:	**0**	**6**	**6**
Without Llama Present:			
Upper Horse Pasture	2	2	4
Watershed I Pasture	3	4	7
West Vassar Pasture	1	0	1
Lower Horse Pasture	0	2	2
Totals:	**6**	**8**	**14**

* may include sheep lost to coyotes, other predators, or other undetermined ("unknown") causes

LLAMA-SHEEP-COYOTE OBSERVATIONS

2/8/97 WATERSHED II; OBSERVER - BOB KEIFFER

0728-- Bob Keiffer spotted Sammy running east along sidehill below the tracking station. He was leading the sheep towards the road in the direction of the WSI/WSII barn. By the time they had reached the road , a coyote appeared on the exact trail the sheep had run. The coyote stood watching the sheep for about 20 seconds, and then disappeared to the west. The llama and sheep remained at the shelter for a few minutes, before heading south to graze.

0813-- The llama and sheep looked and sounded distressed and were then seen huddled together on the road at the Vassar/WSI/WSII fence corner looking back down into WSII. Bob Keiffer walked down the WSII/Vassar fenceline and out to the ridge where the llama had been previously, but he could not see anything. It seems probable that a coyote disturbed them.

2/13/97 WATERSHED II; OBSERVER - KEVIN RYAN

1445-- Coyote M306 appeared walking out of tall grass. Sammy noticed him and moved towards him making guttural spitting noises. He approached the coyote until he was about 20 feet away. Sammy and the coyote stared at one another in confrontation for about 2 minutes. Then Sammy ran downhill, scarring the sheep further downhill away from the coyote. M306 then laid down. The sheep and llama were no longer visible.

2/18/97 WATERSHED II; OBSERVER - BOB KEIFFER

0709-- Sammy seemed very intrigued by something under the live oak tree in the northwest corner of WSI. The same spot where a male coyote had previously been snared.

0727-- A coyote appeared running up the trail under the tracking station towards the sheep. The coyote was less than 60 feet away from the llama. The coyote was later identified as a male and was traveling with a collared female with a limp in her right front leg. At this time only the male was visible. He took a lunge at a ewe and her lamb. The attack was unsuccessful. All sheep and the llama fled downhill. Bob Keiffer lost sight of the attacking coyote and did not see him with the group of escaping sheep.

3/9/97 EAST VASSAR; OBSERVER - CARA MEINKE

2110-- Sheep were bunched up with Sammy in the County Rd. gate corner. Sammy was vigilant and was looking intently southwest over the gate. No coyotes or other possible predators were visible. I scanned the area for about 5 minutes before leaving. It was dark and difficult to see. I had no artificial means of light other than the headlights from my vehicle. Sheep were distressed the entire time. No kills were found the next morning.

3/10/97 LAMBING; OBSERVER - CARA MEINKE

0530-- Hawkin was not with the sheep who were bedded about 400m away on the knoll bordering the Upper Horse fenceline. He was sitting in the middle of the nest boxes about 30 m east of the road. I was tracking F111 when I spotted her on top of pt. 47 which is about 40 m south of where Hawkin sat. I had the spot light on F111 and watched her as she moved off the knoll and east towards the drainage that runs along the Lower Horse/Lambing fenceline. Hawkin was watching the coyote as well. He did not seem distressed or angry, and remained sitting. The coyote did not seem bothered or fearful of the llama. She ran at an easy pace, not a run, and occasionally looked behind her towards me and Hawkin. It was difficult to tell whether she was looking at me or the llama, or whether she was just annoyed by the spotlight. There was a distressed ewe about halfway between the llama and the road. She looked very freaked out and watched the coyote as she ran down the hill about 30m away. I later learned that she was standing beside her dying lamb that Karen had seen convulsing the night before. The lamb was found later at about 0800 still alive and in that same spot. It is possible that Hawkin protected the sickly lamb from the coyote simply due to his presence, but he showed no active, vigilant behavior, only mild interest.

Table 4

Sheep Killed by Coyotes (Confirmed) at HREC

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*
January	1	4	12	2	5	13	8	1
February	2	3	3	10	19	13	18	5
March	7	8	4	15	25	16	16	2
total:	10	15	19	27	49	42	42	8

Predator Research Advisory Committee - UC Hopland Res. & Ext. Center

		Gerald	Beeson	14000 Eel River Rd.	Potter Valley, CA 95469
*	#	Peter	Bradford	PO Box 629	Boonville, CA 95415
*	#	Donna	Furlong	1480 Bohemian Hwy	Sebastopol, CA 95472
*	#	John	Harper	Coop Ext - Ag Ctr./Courthouse	Ukiah, CA 95482
*	#	Charlie	Hunter	DPR, 1020 N. St. Rm. 161	Sacramento, CA 95814-5624
	#	Eva	Johnson	PO Box 548	Boonville, CA 95415
*	#	Malcolm	King	8500 Eastside Rd.	Ukiah, CA 95482
	#	Stephanie	Larson	2604 Ventura Ave. Rm. 100	Santa Rosa, CA 95403-2894
*	#	Fran	Lile	55 Rancho Dr.	Cloverdale, CA 95425
		John	Pinches	PO Box 307	Laytonville, CA 95454
	#	Joe	Pozzi	PO Box 365	Valley Ford, CA 94972
*		Craig	Rohrbough	74500 Covelo Rd.	Covelo, CA 95428
*	#	Don	Torell	7950 Sanel Dr	Ukiah, CA 95482
*	#	Emily	Turula	Alpha Labs, 860 Waugh Ln.	Ukiah, CA 95482

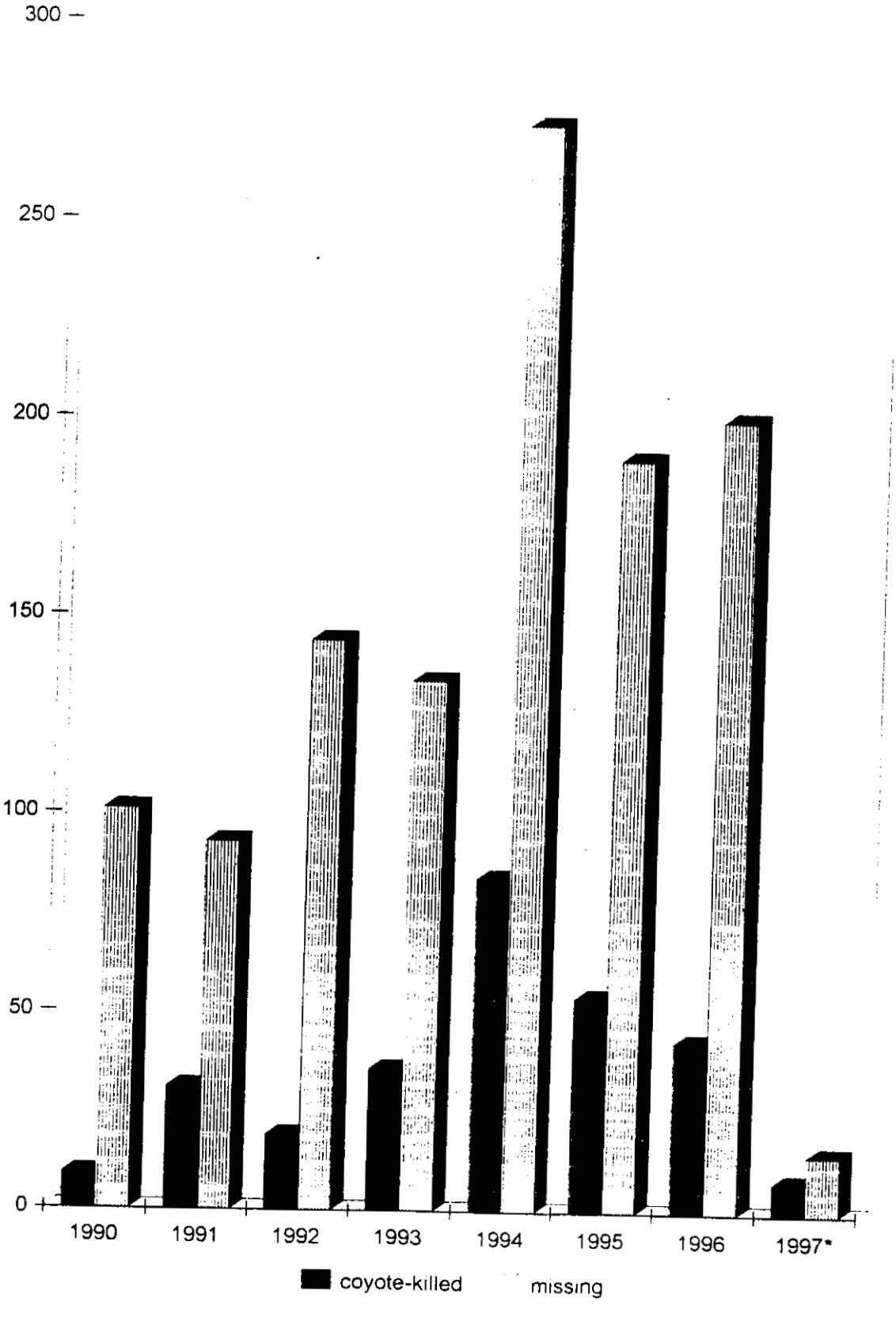
Others In Attendance:

*	#	Karen	Blejwas	UC Berkeley grad student	
	#	Andreas	Chavez	student field technician	
*		Jeff	Dayton	student field technician	
*		Mike	Jaeger	USDA-APHIS-ADC / UC Berkeley	
*	#	Bob	Keiffer	UC - HREC	
	#	Cara	Meinke	student field technician	
		Dale	McCullough	UC Berkeley	
*	#	Kevin	Ryan	student field technician	
*	#	Gary	Simmons	USDA-APHIS-ADC	Sacramento, CA 95825-1800
*	#	Robert	Timm	UC - HREC	

* in attendance, August 26, 1996

in attendance, December 9, 1996

Lambs Lost - Hopland R & E Center



* through 3/25/97